

Curriculum Vitae James J. Anderson

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PERSONAL

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EDUCATION

1969 B.S., Oceanography, University of Washington, Seattle, WA
1977 Ph.D., Oceanography, University of Washington, Seattle, WA
(Graduate Advisor Francis A. Richards)

EMPLOYMENT

2010- Faculty Affiliate, Center for Statistics and the Social Sciences, UW, WA
2006 - Research Professor, School of Aquatic and Fishery Sciences, UW, WA
2001-2006 Associate Research Professor, School of Aquatic and Fishery Sciences, UW, WA
1992-2001 Associate Professor, School of Aquatic and Fishery Sciences, UW, WA
1987-1991 Research Associate Professor, College of Ocean and Fishery Sciences, UW, WA
1983-1987 Research Assistant Professor, College of Ocean and Fishery Sciences, UW, WA
1981-1982 Research Associate, College of Ocean and Fishery Sciences, UW, WA
1981 Visiting Scientist, Dept. of Biophysics, University of Kyoto, Japan
1980-1983 Visiting Scientist, National Institute of Oceanology, Ambon, Indonesia
1980 Visiting Scientist, Institute of Oceanographic Sciences, Wormley, England
1977-1980 Adjunct Assistant Professor, Marine Sciences Research Center, State Univ. of New York, NY
1979-1980 Principal Oceanographer, Fisheries Research Institute, UW, WA
1969-1979 Oceanographer, Dept. of Oceanography, UW, WA

HONORS AND AWARDS

1997 Research is included in the UW publication Pathbreakers: A Century of Excellence in Science and Technology at the University of Washington
1996 College of Ocean and Fishery Sciences Distinguished Research Award

- 1993 Nomination for Computerworld Smithsonian Awards in programming for the CRiSP computer model
- 1990 Special Recognition for participation in the U. S. Fish and Wildlife Service Fish Passageways and Division Structures course
- 1989 Research Faculty Fellowship, College of Ocean and Fishery Sciences
- 1985 Research Faculty Fellowship, College of Ocean and Fishery Sciences

UNIVERSITY SERVICE

School

1988 - 2007 Computer Committee

College

1995-2002 Member, Computer Committee

INTERNATIONAL AND NATIONAL COMMITTEES AND ACTIVITIES

Public Service

- 2010-2011 Panel member of National Research Council Committee on Sustainable Water and Environmental Management in the California Bay-Delta
- 2002- SWARM Development Group Board of Directors (www.swarm.org)
- 2000, 2001, 2008 Speaker on the University of Washington faculty tour
- 2001-2002 Salmonweb President (www.salmonweb.org)
- 1997-2002 Salmonweb Board of Directors: citizen stream monitoring organization
- 1998 Toured Tri-Cities, Walla Walla and Yakima with President Richard McCormick
- 1995 Provided analysis to the Snake River Endangered Species Recovery Team
- 1998-1990 Associate Editor, North American Journal of Fisheries Management
- 1987 Puget Sound water quality planning committee, ad hoc committee on nutrient
- 1990-1993 University Task Force on Salmon and the Columbia River System - represent the UW in a group of faculty from the NW universities with interests and expertise relating to the Columbia River system
- 1995 Ravenna Creek Feasibility Study - joined with representatives of neighborhoods adjacent to Ravenna

Expert Witness

Federal Energy Regulatory Commission Court, 1982

Memberships in Professional Societies

Sigma Xi, American Fisheries Society, Resource Modeling Association, Ecological Society of America, Cognitive Science Society, Society of Mathematical Biology, Population Association of America

EDITORIAL AND REVIEW SERVICES

Journal Activities

1988-1989 Associate Editor, North American Journal of Fisheries Management

Proposal Reviews

US Forest Service, EPA Environmental Biology Review Panel, EPA Environmental STAR Review Panel, NSF Biological Oceanography, Physiological Processes, U.S. Geological Survey, Natural Environmental Research Council, Great Britain, EPA Cooperative Research Programs, NSF Psychobiology, Research and Evaluation Associates, Inc. Bonneville Power Administration Technical Work Group, NSF Physiological Process Section, Oregon Coastal Salmon Restoration Initiative, National Marine Fishery Service.

Journal Reviews

Journal of Marine Research, Limnology and Oceanography. Deep-Sea Research, Continental, Shelf Research, Limnology and Oceanography, Mahasagar-the quarterly journal in Oceanography, International Symposium and Educational Workshop on Fish-Marking Techniques, International Association for Great Lakes Research, North American Journal of Fisheries Management, Transaction of the American Fisheries Society, Canadian Journal of Fisheries and Aquatic Sciences, Northwest Environmental Journal (Illahee), Journal of the American Water Resources Association (JAWRA), Journal of Environmental Management, Journal of Great Lakes Research, Hydrobiologia, Fisheries, Ecological Applications, Ecology, Palaeontologia Electronica, Mathematical Bioscience, Ecological Modelling, Journal of Fish Biology, Theoretical Population Biology, American Naturalist, Reviews in Fisheries, Environmental Biology of Fishes, New Zealand Journal of Marine and Freshwater Research, San Francisco Estuary and Watershed Science, River Research and Applications

National Review Panels

EPA Environmental Biology Review Panel, 1987

PATH (Plan to Analyze and Test Hypotheses) an analysis group sponsored by Northwest Power Planning Council and the National Marine Fisheries Service to evaluate the impacts of dam removal on Snake River salmon 1996-2000

EPA Environmental STAR Review Panel, 2001

CALFED Bay-Delta Restoration Panel, 2002

CALFED Bay-Delta Environmental Water Account Review Panel, 2001-2007

NMFS Salmon and Steelhead Technical Recovery Team for the Central Valley of California 2003-2006

OCAP Technical Review Panel to review National Marine Fisheries Service (NMFS) Fisheries October 2004 Biological Opinion on Long-term Central Valley Project and State Water Project Operations Criteria and Plan (OCAP) 2005

California Bay Delta Conservation Plan (BCDP) Scientific Advisory Panel. 2007.

CALFED- Adaptive Management Planning Team (AMPT) for the ERP Delta Restoration Plan Delta Regional Ecosystem Restoration Implementation Plan (DRERIP). Editor for species models - 2007-2010

NOAA Fisheries Scientific Forum: 2008-2009 Collapse of the Sacramento Fall Chinook Stock and Decline of other West Coast Salmon Stocks.

Scientific Review of the Two Gates Project for the CALFED Bay-Delta Program. – 2009
National Research Council Committee on Sustainable Water and Environmental Management
in the California Bay-Delta – 2010-2011
Review Panel for NOAA National Marine fisheries Service/ US fish wildlife Service review
pane on the Central Valley Project Biological Opinion - 2010

PUBLIC HEARINGS

Federal

Testimony presented before the Subcommittee on Water and Power of the US House of
Representatives Committee on Resources. Washington D.C., June 1995
Testimony before the Subcommittee on Water and Power of the Senate Energy and Natural
Resources Committee Washington D.C., June 1995 - Analysis of Snake River Spill
Testimony before the U.S. House of Representatives Subcommittee on Water and Power in
Lewiston, Idaho, May 31, 1997
Testimony before the U.S. Senate Subcommittee on Water and Power in Vancouver,
Washington, February 17, 1998
Testimony before the U.S. House of Representatives Committee on Resources, Pasco,
Washington, September 2, 1998
Testimony before the U.S. Senate Subcommittee on Water and Power in Hood River,
Oregon, April 6, 1999
Testimony before the U.S. House of Representatives Committee on Resources Subcommittee
on Water and Power and Subcommittee on Fisheries, Conservation, Wildlife and Oceans,
Washington D.C., May 27, 1999
Testimony before the Subcommittee on Water and Power of the Senate Energy and Natural
Resources Committee, Washington D.C., April 2000 - State of Analysis of Endangered
Salmon Stocks
Testimony before the Subcommittee on Fisheries, Wildlife and Water of the Senate
Committee on Environment and Public Works, in Boise Idaho November 20, 2000 held
in Boise, Idaho, November 20, 2000
Testimony before the U.S. House of Representatives Committee on Resources Subcommittee
on Water and Power, Washington D.C., May 19, 2001
Testimony before the U.S. House of Representatives Committee on Resources concerning the
use of science in the Endangered Species Act, Washington D.C., March 20, 2002

State

Oregon Joint House Senate Committee on Salmon Recovery, 1999
Oregon Department of Fish and Wildlife, 1999
U.S. Senate Committee on Energy and Natural Resources, 1999
Legislative Briefing to the Idaho State Legislature, 1999
Oregon Water Commission, 1998
Idaho Fish and Game Commission, 1998
Washington State House and Senate Subcommittees on the Environment, 1996

Northwest Power Planning Council, 1991, 1994, 1996, 1998, 1999, 2000, 2001, 2002
Oregon Department of Environmental Quality, 1995
Washington State Columbia River Task Force 2005
Oregon Joint House Senate Committee, 2007

SELECTED INTERVIEWS

High country news, 2009
Washington Post, reporter Blaine Hardin, 2005
Boston Globe by Jessica Kowal, Globe Correspondent: As flow of salmon surges, US moves to cut protections. September 19, 2004
New York Time by Sam Howe Verhovek U.S. Giving a Lift to Salmon, But Future of Aid Is in Doubt. New York Times, May 6, 2000
Science Times-News, by N.S. Nokkentved. Scientists Tackle Salmon April 21, 2000, Twin Falls, Idaho
Charles C. Mann and Mark L. Plummer are the authors of Noah's Choice.
Can Science Rescue Salmon? Science Magazine, August 4, 2000
Seattle Post-Intelligencer, by Robert McClure. *Snake River Dam Issue Defies Simple Answers.* May 26, 2000
The Idaho Statesman, by Rocky Barker. *Feds Consider Restricting Dams to Help Salmon* April 28, 2000
Tacoma News Tribune Steve Maynard; The News Tribune February 23 2001, Columbia needs care of all: CATHOLIC BISHOPS: Letter calls on people of Northwest to use river for 'common good,' assume responsibility.
Washington Stage Farm Bureau on salmon and dams , 2000
CSPAN presentation of testimony before the Senate Power Water subcommittee of the Senate Energy and Natural Resources Committee, 2000
KIRO TV interview on global impacts on fish, 1999
McNeil Lehrer News Hour – Interview for story on Columbia River salmon, 1995

RESEARCH

Biomathematics, biodemography, ecosystem modeling, ecohydrology, fisheries, toxicology, animal and human behavior and decision making.

Current Projects

1. ***Columbia River Salmon Passage Model (HYDRO/CBR)***
Bonneville Power Administration (BPA) \$11,822,738 for 1989-2011
Develop a management model for Columbia River hydroelectric and fisheries agencies. The work involves building models and analyzing data on the migration and survival of salmon through the Columbia River System, creating and maintaining a computer network throughout the Pacific Northwest for model users.
Collaborators: 1) Staff: Nick Beer, Christine Muongchanh, Chris Van Holmes, Susannah Iltis; 2) Grad. Student(s): Jennifer Gosselin, Ting Li Chloe Bracis, and Daniel Widener.
2. ***Second-Tier Database Support (DART/CBR)***
Bonneville Power Administration (BPA) \$3,314,262 for 1998-2011
The second-tier database and web services provide integration and direct and timely public access to Columbia Basin environmental, operational, fishery, administrative and other information essential to sound operational and resource management decisions by the Federal Government.
Collaborators: 1) Staff: Nick Beer, Susannah Iltis, Christine Muongchanh, Chris Van Holmes, and Peter Westhagen (from Dr. Skalski's group).
3. ***Juvenile Passage Model Development (Compass/NMFS)***
National Marine Fisheries Service (NMFS) \$175,000 for 2006-2011
NOAA Fisheries, along with collaborations throughout the Northwest region, is developing a model (Comprehensive Passage Model, COMPASS) of the migration of juvenile salmon through the Snake and Columbia rivers. COMPASS depicts the passage of fish past dams and through reservoirs and is based on extensive data sets. The model is being developed in the C programming language and contains a graphical user's interface. In addition, developing the model requires analysis of data to develop model algorithms.
Collaborator: 1) Nick Beer, Susannah Iltis, Chris Van Holmes; 2) Undergrad student: Jimmy Potter.

Pending Projects to be Funded in 2011

1. ***Algorithm Support for Integrated Cognitive Model of Movement Behaviors for Discerning the Intent of Subgroups (Algorithm Support-ACOE)***
US Army Corps of Engineers (USACE) \$195,000 for 2011-2013
Development of models of animal and human decision making in migration and movement behavior.
Grad. Student(s): Chloe Bracis.
2. ***Vitality Study***
Center for Statistics and the Social Sciences (CSSS) Seed Grant Program, Univ. of Washington, \$24,731 for 2011
The overall aim of this project is to apply the vitality framework to model human mortality patterns. The work extends the vitality model, which describes mortality through the intrinsic stochastic loss of vitality, by including extrinsic stress challenges characterized by age-dependent magnitude and frequency. Preliminary work demonstrates that of the model fits human mortality patterns in period and cohort data remarkably well and provides biological and behavioral interpretations of mortality curve features and the historical changes in the features. The seed funds will assist in completion of three objectives: 1) journal submission of

a manuscript analyzing historical patterns in mortality in Sweden, II) journal submission of a manuscript modeling early life stressors (heat shock) on longevity in drosophila and fish, and III) resubmission of a proposal (co-PI Professor Sam Clark of the Department of Sociology) to the Social Sciences and Population Studies Study Section of NIH. The NIH proposal aims are 1) identify external factors that affect survival patterns in communities, 2) evaluate treatment strategies of pandemic diseases, and 3) quantify effects of acute disease and stress on longevity.

Grad. Student(s): Ting Li.

Past Projects

2007-2009	Adaptive Ecological Networks (AdEconet). Funded by U.S. Army Engineering Research and Development Center (NOAA) (\$280,000).
2007-2008	Determine mechanisms of latent mortality. Funded by National Marine Fisheries Service (\$72,300).
1989-2001	Subcontract to assist in developing Chinook Technical Committee model through ESSA Technologies, Ltd (\$33,993).
1996-2000	Modeling Support for the Army Corps of Engineers (\$1,243,028).
1996-2000	Plan for Analysis & Testing Hypotheses (PATH), Bonneville Power Administration (\$852,317).
1999	EPA habitat assessment grant through University of California, Davis (\$12,672).
1996-1999	Pacific Salmon Conservation, National Marine Fisheries Service (\$559,259).
1995-1998	Smolt Mortality Data Analysis, National Marine Fisheries Service (\$50,315).
1991	Monitoring fish behavior during pile driving. Port of Seattle (\$10,000).
1990-1993	Estuarine turbidity maxima (ETM) in land margin ecosystems: model (Co-PI with C. Simenstad), National Science Foundation (\$173,175).
1990	Sound generated by pile driving activities in the Puget Sound Area (PI), Manson Construction and Engineering (\$85,308).
1990	Sound generated by pile-driving activity in Puget Sound and its effect on juvenile salmonids, State and Industry funding (\$142,308).
1989-1990	Review and design criteria of behavioral fish guidance systems (PI), Army Corps of Engineers (\$30,097).
1989	Columbia River Juvenile Salmon Survival and Predation Workshops (PI), Bonneville Power Administration (\$62,139).
1989	Research Faculty Fellowship, College of Ocean and Fishery Sciences, UW (\$10,000).
1989	Fish behavior modification using piezoelectric neural implants (PI), UW Graduate School (\$2,500).
1988	Low frequency sound measurements at Bonneville Dam (PI), Army Corps of Engineers (\$65,235).
1987-1988	Downstream migrant light response (PI), Stone and Webster Engineering Corp. (\$62,950).

- 1987 Ecological risk assessment through a tripartite decision method (PI), Environmental Protection Agency (\$30,100).
- 1986 Literature survey of mathematical models of tumor growth (PI), UW Marine/Freshwater Biomedical Research Center (\$4,901).
- 1986-1987 Studies on fish behavior to improve fish guidance efficiency at hydroelectric projects (PI), Chelan Public Utility (\$151,000).
- 1985 Research Faculty Fellowship, College of Ocean and Fishery Sciences, UW (\$8,100).
- 1984-1987 Competitive disadvantage of organisms exposed to toxic substances as embryos (Co-PI), Environmental Protection Agency (\$300,000). (PIs: Professors Landolt and Kocan).
- 1982-1984 Seahurst Baseline Study (project leader), Metro of Seattle (\$600,000). (Professor Stober, PI).
- 1977-1978 Multidisciplinary Eastern Tropical Experiment (PI), Office of Naval Research (\$175,000). (Professor Richards was Co-PI).
- 1975-1977 Deep Ocean Mining Study (Co-PI), National Oceanic and Atmospheric Administration (\$300,000). (Professor Richards was Co-PI).

COURSES

Course#	Course Title (quarter credits)	Date	Enrollment	Assessment
QSCI 551	Organism Dynamics (3) ¹	Winter 1992	4	4.18
QSCI 551	Organism Dynamics (3)	Winter 1994	10	4.25
QSCI 551	Organism Dynamics (3)	Winter 1996	5	4.07
QSCI 550	Ecosystem Modeling, 2 guest lectures on Stochastic Modeling, Autumn 1989 3 guest lectures on Stochastic Modeling, Spring 1993 Team taught w Drs. Francis & Leschine, Spring 1995			
CQSCI 597	Behavioral Ecology Seminar (S)	Winter 1996	6	
CQSCI 597	Behavioral Ecology Seminar (S)	Summer 1993	3	
CQSCI 597	Seminar Disease in Ecology (2)	Winter 1993	11	
	Joint course with J. Murray of Applied Math			
CQSCI 598A	Columbia River Seminar 1988, 13 students, autumn 1989, 8 students, winter 1989, 7 students, spring 1991, 7 students, summer			
CQSCI 598A	Scientific Writing Seminar (2) 1992, 5 students, Summer 1993, 3 students Summer			
QERM 597	Graduate Seminar	Autumn 2009	13	
QERM 597	Graduate Seminar	Autumn 2010	7	

As a research Professor, my current teaching consists mostly of a weekly whiteboard session in which we discuss modeling. The attendance varies from 6 to 12 students.

¹ Organism dynamics and individual based ecological models. Individual based models (IBMs) were used to model complex ecological systems by linking a series of smaller models defining aspects of organism performance or dynamics. Surveyed approaches to model organisms and their interactions including both physiological and behavioral dynamics over a range of scales from cells to complete organisms. Several approaches relating organism dynamics to their population were explored.

GRADUATE STUDENTS AND STAFF

Student Programs Completed

Brett Dumbauld - M.S. Fisheries, 1985

The distributional ecology and zooplankton in east passage and the main basin of Puget Sound

Richard Nemeth - M.S. Fisheries, 1989

The photobehavior responses of juvenile chinook and coho salmon to strobe and mercury lights

Blake Feist - M.S. Fisheries, 1991

*Potential impacts of pile driving on juvenile pink (*Oncorhynchus gorbuscha*) and chum (*O. keta*) salmon behavior and distribution*

Richard Hinrichsen - Ph.D., Quantitative Ecology and Resource Management, 1994

Optimization models for understanding migration patterns of juvenile chinook salmon

Richard Zabel - Ph.D Quantitative Ecology and Resource Management, 1994

Spatial and temporal models of migrating juvenile salmonids with applications

Saang-Yoon Hyun - M.S. Fisheries, 1996

*Ocean distribution of the Columbia River Hanford Reach and Snake River fall chinook salmon (*Oncorhynchus tshawytscha*) stocks and the effect of interannual ocean conditions on their survival*

W. Nicholas Beer, M.S. Quantitative Ecology and Resource Management, 1996

*A growth model for larval salmon with application to field and laboratory observations of chinook salmon (*Oncorhynchus tshawytscha*)*

Susan Lubetkin - M.S. Quantitative Ecology and Resource Management, 1997

Multi-source mixing models: food web determinations using stable isotope tracers

Ashley Steel – Ph.D. Quantitative Ecology and Resource Management, 2000

In-stream factors affecting juvenile chinook salmon migration (Co-chair with P. Gutorp)

Owen Hamel - Ph.D. Quantitative Ecology and Resource Management, 2001

The Dynamics and Effects of Disease in Columbia and Snake River Salmon Populations

Saang-Yoon Hyun - Ph.D. Quantitative Ecology and Resource Management, 2002.

Bristol Bay salmon run timing prediction (Co-chair with R. Hilborn)

Kevin Brinck – M.S. Quantitative Ecology and Resource Management, 2002

Comparing method for inferring site biological condition from a sample of site biota (Co-chair with J. Karr)

Molly Cobleigh – M.S. Aquatic and Fishery Sciences, 2003

Stress, Growth and Survival of Juvenile Chinook Salmon

Nathan Zorich – M.S. Aquatic and Fishery Sciences, 2004

Foraging behavior and swimming speed of the northern pikeminnow (Ptychocheilus oregonensis) in the Columbia River.

Abran Steel-Feldman – M.S. Quantitative Ecology and Resource Management – 2006

Learning models and animal behavior: exploring the dynamics of simple models

Ting Li – M.S. Quantitative Ecology and Resource Management – 2008

The Extension of the Vitality Model and Its Application

Eli Gurarie – Ph.D. Quantitative Ecology and Resource Management – 2008

Models of movement and migration: from individual tracks to mass dispersal

James Murphy – Ph.D. Aquatic and Fishery Sciences – 2010

Spatial Dynamics of the Eastern Bering Sea Snow Crab (Chionoecetes opilio)

Chloe Bracis – M.S. Quantitative Ecology and Resource Management – 2010

A model of the ocean migration of Pacific Salmon

Ting Li – Ph.D. Quantitative Ecology and Resource Management – 2011

Visualize the Intrinsic and Extrinsic Processes that Determine the Patterns of Human Mortality

Post docs

J Hayes – 1995-1997

R. Zabel – 1995-1997

B. Lemasson – 2007-2009

Student programs in progress

Edward Zapel – Ph.D. Aquatic and Fishery Sciences – 2004

Jennifer (Tran) Gosselin – Ph.D. Aquatic and Fishery Sciences – 2006

Daniel Widener – M.S. Aquatic and Fishery Sciences – 2008

Brian Burke – Ph.D. Aquatic and Fishery Sciences – 2009

Gregor Passolt – M.S. Quantitative Ecology and Resource Management – 2010

Chloe Bracis – Ph.D. Quantitative Ecology and Resource Management – 2010

Staff

N. Beer - Research Consultant

S. Iltis - Public Information Specialist

C. Muongchanh – Manager, Program Operations

C. Van Holmes - System Analyst Programmer III

PUBLICATIONS

Refereed Publications

- Murphy, J.T., A.B. Hollowed, and J.J. Anderson. (2010). Snow Crab Spatial Distributions: Examination of Density-Dependent and Independent Processes. In: G.H. Kruse, G.L. Eckert, R.J. Foy, R.N. Lipcius, B. Sainte-Marie, D.L. Stram, and D. Woodby (eds.), *Biology and Management of Exploited Crab Populations under Climate Change*. Alaska Sea Grant, University of Alaska Fairbanks. doi:10.4027/bmecpcc.2010.19
- Beer, W. N. and J. J. Anderson (2010). Sensitivity of juvenile salmonid growth to future climate trends. *River Research and Application*.
- National Academy of Sciences. 2010. A scientific assessment of alternatives for reducing water management effects on threatened and endangered fishes in the California's Bay Delta. Committee on Sustainable Water and Environmental Management in the California Bay-Delta. The National Academies Press; National Research Council, Washington, D.C. <http://www.nap.edu/catalog/12881.html>
- Anderson, J. J. 2010. Ratio- and Predator-Dependent Functional Forms for Predators Optimally Foraging in Patches. *American Naturalist*, 175:240-249.
- Lemasson, B. H., J. J. Anderson, and R. A. Goodwin. 2009. Collective motion in animal groups from a neurobiological perspective. *Journal of Theoretical Biology*, 261:501-510.
- Anderson, J. J. and W.N. Beer. 2009. Oceanic, riverine and genetic influences on spring Chinook salmon migratory timing. *Ecological Applications*, 19(8):1989-2003.
- Li, T. and J.J. Anderson. 2009. The vitality model: A way to understand population survival and demographic heterogeneity *Theoretical Population Biology* 76:118-131.
- Gurarie, E. J.J. Anderson, and R. W. Zabel. 2009. Incorporating population heterogeneity into models of animal dispersal and movement. *Ecology* 90: 2233-2242.
- Zabel, R. W. J. Faulkner, S.G. Smith, J. J. Anderson, C. Van Holmes, N. Beer, S. Iltis, J. Krinkie, G. Fredicks, B. Bellerud, J. Sweet, and A. Giorgi. 2008. Comprehensive Passage (COMPASS) Model: a model of downstream migration and survival of juvenile salmonids through a hydropower system. *Hydrobiologia* 609:289-300.
- Nestler, J. M., Goodwin, R. A., Smith, D. L., Anderson, J. J., and Li, S. 2008. Optimum Fish Passage and Guidance Designs are Based in the Hydrogeomorphology of Natural Rivers. *River Research and Applications* 24:148-168.
- Anderson, J. J., M. C. Gildea, D. W. Williams, and T. Li. 2008. Linking growth, survival and heterogeneity through vitality. *American Naturalist* 171, E20-E43. <http://www.journals.uchicago.edu/doi/full/10.1086/524199>
- Nestler, J. M., Goodwin, R. A., Smith, D. L., and Anderson, J. J. 2007. A Mathematical and Conceptual Framework for Ecohydraulics. Chapter 12 in *Hydroecology and Ecohydrology: Past, Present and Future*, Hydroecology and Ecohydrology: Past, Present and Future (eds. Wood, Hannah, Sadler) John Wiley & Sons.
- Goodwin, R. A., J. M. Nestler, J. J. Anderson, and L. J. Weber. 2007. A New Tool to Forecast Fish Movement and Passage. *Hydro Review* 27(4):58-71.

- Lindley, S. T., R. S. Schick, E. Ethan Mora, P. B. Adams, J. J. Anderson, Sheila Greene, C. Hanson, B.P. May, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams. 2007. Framework for Assessing Viability of Threatened and Endangered Chinook Salmon and Steelhead in the Sacramento-San Joaquin Basin" San Francisco Estuary and Watershed Science Vol. 5, Iss. 1, Art. 4 repositories.cdlib.org/jmie/sfew/s/vol5/iss1/art4/
- Weber, L.J., R.A. Goodwin, S. Li, J.M. Nestler, J.J. Anderson. 2006. Application of an Eulerian–Lagrangian–Agent method (ELAM) to rank alternative designs of a juvenile fish passage facility. *J. Hydroinformatics* 8:271-295.
- Lindley, S. T., R. S. Schick, A. Agrawal, M. Goslin, T. E. Pearson, E. Mora, J. J. Anderson, B. May, S. Greene, C. Hanson, A. Low, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams. 2006. Historical population structure of Central Valley steelhead and its alteration by dams. *S. Francisco Estuary Watershed Science*. 4(1): article 3. 21 p.
- Salinger, D. H, and J.J. Anderson (2006) Effects of Water Temperature and Flow on Migration Rate of Adult Salmon. *Transactions of the American Fisheries Society*.135:188-199.
- Goodwin, R. A., J. M. Nestler, J. J. Anderson, L. J. Weber, and D. P. Loucks. 2006 Forecasting 3-D fish movement behavior using a Eulerian–Lagrangian–agent method (ELAM), *Ecological Modelling*. 192:197-223.
- Hyun, S., R. W. Hilborn, J. J. Anderson, and B. Ernst. 2005. A statistical model for in-season forecasts of sockeye salmon returns to the Bristol Bay districts, *Canadian Journal of Fisheries and Aquatic Sciences*. 62:1665-1680.
- Springman, K. R., G. Kurath, J. J. Anderson, and J. Emlen. 2005. Contaminants Viral Cofactors: Assessing Indirect Population Effects with the Vitality Model. *Aquatic Toxicology* 71, 13-23.
- Anderson J.J., E. Gurarie, and R. W. Zabel. 2005. Mean free-path length theory of predator-prey interactions: application to juvenile salmon migration. *Ecological Modelling* 186:196-211.
- Salinger, D. H, and J.J. Anderson and O. Hamel. 2003. A parameter fitting routine for the vitality based survival model. *Ecological Modeling* 166(3): 287-294.
- Hamel, O.S. and J.J. Anderson. 2002. The relationship of antigen density to bacterial load in spawning female pacific salmon infected with bacterial kidney disease. *Diseases of Aquatic Organisms* 51:85-92.
- Anderson, J. J. 2002. An agent-based event drive foraging model. *Natural Resource Modeling*. Volume 15, Number 1, p 55-82.
- Beer, W. N. and Anderson, J. J. 2001. Effects of spawning behavior and temperature profiles on salmon emergence: Interpretations of a growth model for Methow river chinook. *Canadian Journal of Fisheries and Aquatic Sciences*. 58(5):943-949.
- Steel, E. A., P. Guttorp, J.J. Anderson and D.C. Caccia. 2001. Modeling juvenile migration using a simple Markov chain. *Journal of Agricultural, Biological and Environmental statistics*. Volume 6, Number 1 pages 80-88.
- Norris, J. S. Hyun, J.J. Anderson . 2000. Ocean Distribution of Columbia River Upriver Bright Fall Chinook Salmon Stocks. Pages 221-232 in Recent Changes in Ocean

- Production of the Pacific Ocean, Edited by J.H. Hella, Y. Ishida, D. Noakes and V. Radchenko. *North Pacific Anadromous fish Commission Bulletin # 2*. Vancouver Canada.
- Anderson, J.J. 2000. A vitality based model relating stressors and environmental properties to organism survival. *Ecological Monographs* 70(3) 117-142.
- Anderson, J.J. 2000. Decadal climate cycles and declining Columbia River salmon. In *Sustainable Fisheries Management: Pacific Salmon*. Ed. E. Knudsen. CRC Press, Boca Raton. P. 467-484.
- Anderson, J. J., R. W. Zabel and R. H. Hinrichsen. 2000. Modeling the impacts of John Day drawdown on the survival of salmonid stocks. Attachment F in Salmon Recovery through John Day Reservoir. John Day Drawdown Phase I Study: Biological/Environmental Technical Appendix Aquatic Resource Section. U.S. Army Corps of Engineers Portland district. January 2000.
- Helu, S.L., J.J. Anderson, D.B. Sampson. 1999. An individual-based fishery model and assessing fishery stability. *Natural Resource Modeling*. 12(2) 213-247.
- Zabel, R.W., J.J. Anderson, and P.A. Shaw. 1998. A multiple reach model describing the migratory behavior of Snake River yearling chinook salmon (*Oncorhynchus tshawytscha*). *Canadian Journal of Fisheries and Aquatic Sciences*: 55:658-667.
- Beer, W. N. and Anderson, J. J. 1997. Modeling the growth of salmonid embryos. *J. theor. Biol.* 189, 297-306.
- Zabel, R. and J.J. Anderson. 1997. A model of the travel time of migrating juvenile salmon, with an application to Snake River spring chinook salmon. *North American Journal of Fisheries Management*, 17:93-100.
- Anderson, J.J. 1996. Review of the influence of climate on salmon. In Plan for Analyzing and Testing Hypotheses (PATH): Final report on retrospective analyses for fiscal year 1996. Compiled and edited by ESSA Technologies Ltd., Vancouver, B.C.
- Nemeth R. and J.J. Anderson. 1993. Response of juvenile salmon to light. *North American Journal of Fisheries Management*. 12:684-692.
- Anderson, J.J. 1992. A vitality based stochastic model for organism survival. In *Individual-Based Models and Approaches in Ecology: Populations, Communities and Ecosystems*. Editors DeAngelis and Gross, Chapman Hall, New York. p 256-277.
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Technical Publications and Reports

Anderson, J.J. 2010. Heterogeneity and Culling. BPA Technical Report 2009.

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MEETING AND CONFERENCES

- 2010 Swarmfest, Swarm Development Group annual meeting 2010, Santa Fe, NM.
- 2010 Society for Mathematical Psychology Annual meeting, Portland, OR, August 2010.
- 2010 Pavlovian conditioning from a foraging perspective Annual meeting of the Cognitive Science Society, Portland, OR, August 2010.
- 2010 Cognition in Fish passage. Leverhulme International fish passage workshop. Winnipeg, CA (2010).
- 2009 *Towards a comprehensive model of latent mortality*. Anadromous Fish Evaluation Program Annual Review. Walla Walla, Washington, December 2009.
- 2009 *Advantages of a retinal-based model for studying swarm cognition*. Swarm Cognition Workshop at 31st Annual Meeting of the Cognitive Science Society. Amsterdam, July 2009.
- 2009 *Oceanic, riverine and genetic influences on spring Chinook salmon migratory timing*. American Fisheries Society Portland, May 2008.
- 2007 *The boiling frog syndrome: Navigating by weak and oscillatory cues* American Fisheries Society, San Francisco, September 2007.
- 2007 GEAR UP speaker at Summer Institute (a college awareness program).
- 2005 Pacific Decadal Oscillation, Climate Change and Northwest Salmon; Climate Change Forum, Maryhurst University Portland October 8.
- 2005 Practical Paths to Salmon Recovery, Part II. Workshop sponsored by Northwest Power Planning council and Idaho council on Industry and the Environment. October 5, Boise ID.
- 2005 *Columbia River water management and fish*. Washington State Columbia River Taskforce. Olympia, WA June 28.
- 2005 *Linking mortality and maturation age through vitality*. Workshop on Mathematical and Statistical Models in the Biodemography of Aging. University of California at Berkeley June 5-8.
- 2005 *Hydrodynamic and Fish Behavior Models to Forecast Fish Passage Through Rivers and Dams*. Quantitative ecology and resource management spring seminar UW. May 25. (Lecture).
- 2005 *Managing stream flows for fish*. March 8 lecture to Tuesday morning Seminar Series of the Center for Water and Watershed Studies seminar series (Lecture)
- 2004 *Quantifying passage stress affects on long-term fish survival* Presented at American Fisheries Society – 134th Annual Meeting, Madison, Wisconsin, August 2004. (Conference presentation)
- 2004 *Vitality as a measure of ecosystem health*. Presented at the U.S. Army Corps of Engineers Waterways Experimental Research Station. Vicksburg Mississippi April 2004. (Lecture)
- 2004 *Can a single process link lifespan and maturation?* Presented to Fisheries Quantitative Seminar February 2004. (Lecture)

- 2004 *Effects of Columbia River flow on salmon*. Presentation to Snake Columbia River Irrigators Association Annual meeting July 22, 2004. (Lecture)
- 2004 *Use of models in salmon recovery planning in Oregon and Washington*. Presented at the Joint CWEMF / Central Valley Technical Recovery Team Technical Workshop on Using Models in Endangered Species Act Recovery Planning September 7, 2004 Sacramento California. (Lecture).
- 2003 *The Restoration of Central Valley Chinook Salmon and Steelhead - Advice to California.*" San Francisco Estuary Project's Biennial State of the Estuary Conference in Oakland California October 2003 (Conference presentation)
- 2003 *Sustaining salmon: an ecological perspective*. Presented to Civil Engineering Graduate Seminar September 2003. (Lecture)
- 2003 *"The science of flow augmentation: will draining Idaho save salmon.* 20th Annual Water Law and Resource Issues Seminar. Idaho Water Users Association. November 20, 2003. (Conference presentation)
- 2003 *Effects of flow on survival Flow and survival*. Presented at the Idaho Water Users Association 20th Annual Water Law & Resource Issues Seminar. Boise Idaho, November 2003 (Lecture)
- 2003 *"Fish swim a gauntlet of predators: theory of molecular collisions path lengths gives a new look of predator prey interactions"* Applied computational Sciences Seminar Series. University of Washington. November 2003. (Lecture)
- 2003 *The Restoration of Central Valley Chinook Salmon and Steelhead - Advice to California.*" Biennial State of the Estuary Conference. Oakland CA, October. (Conference presentation)
- 2002 *"Computer-based decision-making for Columbia River salmon: A fifteen-year perspective of success and failure*, Beaverton, Oregon Graduate School. OR, October. (Lecture)
- 2002 *"The effect of decadal scale climate cycles on salmon recovery,"* Seattle Business Council, Seattle, October. (Lecture)
- 2002 *Dealing with conflicting science*. Environmental Journalism Academy 2002. Seattle University, August. (Workshop presentation)
- 2002 *An Agent-based event-driven foraging model*. National Center for Caribbean Coral Reef Research (NCORE) NCORE-hosted workshop, The Future of Decision Support for Coral Reef Management: Agent-based Models and Interdisciplinary Research. Miami, July. (Conference presentation)
- 2002 *Columbia River salmon*. Pasco-Kennewick Rotary, Kennewick, WA, May 1. (Keynote Talk)
- 2002 *Challenges in science-based salmon management: Lessons from the Northwest*. CALFED Science workshop. April 22-23. Sacramento, CA. (Workshop presentation)
- 2002 *Computer models and resource management* presented March 8 to The Science & Technology Roundtable (STRT), which is a group of Washington State technology business and community leaders dedicated to increasing their understanding of contemporary topics in science and technology. (Keynote Talk)

- 2002 *A decision algorithm with memory and learning*: Swarmfest 2002. University of Washington. (Conference presentation)
- 2002 *Use of vitality in understanding delayed mortality* at the ACOE Transportation and Delayed mortality workshop. Skamania Lodge Stevenson, WA.
- 2001 *An Agent-Based Model of Fish Behavior: Part III* Swarmfest 2001 Santa Fe New Mexico.
- 2001 Regional Water and Power Policy: Making Changes. Sponsored by the Columbia-Snake River Irrigators Association, Eastern Oregon Irrigators Association and Columbia Section of the American Society of Civil Engineers, Pasco Washington, July 23. (Panel member speaker)
- 2001 *The Salmon Story*, Keynote speaker to the Seattle City Council on their visit to Ice Harbor Dam, June, June 29. Pasco.
- 2001 Panel Speaker at Regional Water and Power Policy: Making Changes. Annual meeting of the Columbia-Snake River Irrigators Association, Eastern Oregon Irrigators Association and Columbia Section-American Society of Civil Engineers. July 23. Pasco. (Conference presentation)
- 2001 *Flow Augmentation Review*, Presentation to the NPPC Independent Scientific Advisory Board, February.
- 2001 *Interactions of Models and Data in the PNW Salmon Recovery Actions*: the NMFS Biological Opinion. CEWA 520 Seminar. January 25, Palmer, instructor. (Invited Lecture)
- 2001 *Columbia River salmon*. Lecture presented to the University of Washington Environmental Law Seminar. 2001.
- 2001 *Recovering Endangered Salmon*, Invited speaker at the Horizon Men's Club April 19.
- 2000 *Advancing the Individual-based Modeling Approach: New Tools and Concepts*. Sponsor/organizer of symposium #27 at the Ecological Society of America 2000 Annual Meeting. Railsback, S. J., Anderson and R. Lamberson.
- 2000 *Multidisciplinary approaches to environmental Management*. Science Politics and Modeling Snake River Salmon survival. at the CEWA 520 Seminar. R. Palmer, instructor.
- 1999 *Modeling the Northwest Dams and the Effect on Salmon*. Evans School of Public Affairs and the Northwest Forum Lecture series presentation. December.
- 1999 *Dam - Removal Wild is Wooly: the Case Against*. Pacific Fishery Biologist." annual Meeting Astoria Or., Oct 1999.
- 1999 *The effects of Oceans on Salmon survival*. Washington State University Tri -City. Lecture on. Pasco, WA. Oct.
- 1998 *"Salmon Management Models"*. Santa Fe Institute Workshop on Integrating GIS and Multi-Agent Modeling Techniques.
- 1998 *Columbia River salmon restoration*. University of Washington Environmental Law Forum.
- 1998 *Salmon and Society*. American Society of Chemical Engineers Chemical Engineers Annual Meeting Northwest Division, University of Washington.

- 1997 *Merging Toxicology & Population Ecology: A vitality model to extrapolate laboratory studies to the field.* Northwest Biological Science Center, Seattle, Washington.
- 1996 Towards Sustainable Fisheries Conference, Victoria B.C., April 1996.
- 1996 Estuarine and Ocean Survival of Pacific Salmonids. National Marine Fisheries Workshop held in Newport, Oregon, March 1996.
- 1996 *Is it the dam, the river or the ocean?* Columbia River Association Salmon symposium.
- 1996 *The Art of Modeling.* Natural Resource Societies Science Day in Washington D.C. June.
- 1996 American Fisheries Society Portland Chapter Annual Meeting. Plenary Panel on Columbia/Snake River and Regional Salmon Conservation Plans.
- 1996 Congressional Staff Public Power Tour to Eastern Washington. Hosted by Washington State Public Power Association.
- 1995 Congressional Staff Public Power Tour. Hosted by Washington State Public Power Association.
- 1994 *Declining Salmon Fisheries.* Presented at the 1994 Ecosystem Management in Western Interior Forests. May 1994. Spokane, Washington. Science Team leader in session on Strategies for Resolving Major Ecosystem Issues.
- 1994 First Nations Conference of Fisheries. Vancouver BC. January 1994.
- 1994 Workshop on Defining Flow Survival Relationships in the Columbia River. Sponsored by the Northwest Power Planning Council.
- 1994 Lamprey Barrier Research Workshop. Minnesota, Feb 1994.
- 1993 *Software for Sustainability: A Columbia River Example.* Lecture in the Institute for Environmental Studies Seminar Attaining a Sustainable Society.
- 1993 *Integration of Salmon Life Cycle Models - Habitat to Harvest.* University of Washington Center for Streamside Studies Seminar.
- 1992 *What we know and don't know about reservoir survival of juvenile salmonids.* Presented at Chinook Smolt Survival Workshop. University of Idaho. February 26-28, 1992.
- 1992 *Observations and models of the behavior of fish to sound.* Acoustic workshop sponsored by Army Corps of Engineers and the Bureau of Reclamation, Sacramento, March 17.
- 1992 *Mainstem passage models.* Bonneville Power Administration Projects Review. Presentation in Vancouver, WA.
- 1992 *Fish behavior considerations in fish diversion systems.* Lecture for the U.S. Fish and Wildlife Service short course on Fish Diversion Systems. Yakima, WA, April.
- 1992 *History and status of Columbia River Fisheries Models.* Oregon Graduate Institute. April 14.
- 1992 *A vitality based model for organism survival.* Pacific Northwest workshop on Mathematical Biology. University of Washington, April 4.
- 1991 *The History and Restoration of Columbia River Salmon: The Problem of an Endangered Species.* Presented at Earth Day '91 Workshops, Center House, Seattle Center.
- 1991 *Computer Models and Columbia River Management: "An exercise in Fact or Fantasy?"* at the American Institute of Fishery Research Biologist, Northwest Meeting, January.

- 1990 *Fish behavior considerations in fish diversion systems*. Lecture for the U.S. Fish and Wildlife Service, short course on Fish Diversion Systems. Portland, OR, October 22.
- 1990 *Design criteria of behavioral fish guidance systems*. Corps of Engineers Fish Passage Development and Evaluations Program, 1990 Annual Review. Portland, OR. Oct. 19.
- 1990 *Assessment of the risk of pile driving to juvenile fish*. Presented at the 15th annual members meeting and seminar of the Deep Foundations Institute. October 10-12, 1990, Seattle.
- 1990 Symposium/workshop populations, community, and ecosystem: an individual perspective. Knoxville, Tennessee, May 16-19. (Invited participant)
- 1989 *Rebuilding Fish Populations on the Columbia River*. UW Alumni Seminar, Oct 14, 1989.
- 1989 *Fish Reservoir Interactions*. North American Lake Management Society, Seattle, Sept.
- 1988 *The relationship of uncertainty and probability in ecological risk analysis models* (with R. Morison), Ecological Modeling in a Regulatory Framework, sponsored by the International Society for Ecological Modeling, University of California at Davis, August.
- 1987 *A mathematical model for startle response in fish*. International Ethology Conference XX, University of Wisconsin, August.
- 1987 *Strategies for a five year work plan on reservoir mortality and water budget effectiveness evaluation*. Presentation to Pacific Northwest Power Planning Council: December.
- 1987 *Is uncertainty in risk assessment predictable?* (with R. Morison). Environmetrics 87, Washington D.C., November.
- 1987 *A dose-response model based on a stochastic equation of organism health*. Environmetrics 87, Washington D.C., November.
- 1987 *Risk Assessment: Its context, theory and application*, Fish Habitat Short Course, Colorado State University. Nov. 18.
- 1987 *Graphical representation of model uncertainty for risk assessment* (with R. Morison). Workshop on theoretical ecology: Ecodynamics. Oct 19-20 1987, Julich, Germany.
- 1986 Ecological Risk Assessment Colloquium, Environmental Effects branch of the U.S. Environmental Protection Agency, Baltimore. Nov 10-14.
- 1985 NITROP-85 Workshop. Bigelow Laboratory for Ocean Sciences, Booth Bay Maine, July 8-11.
- 1985 *Seasonal distributions of nutrients and chlorophyll in Puget Sound*. University of Washington, Chemical Oceanography Lunch seminar.
- 1985 *Mathematical model of fish feeding behavior*. Behavioral Ecology seminar, Simon Fraser University, March 6. (Invited participant)
- 1985 *Model of fish feeding behavior*. Marine Sciences Research Center, State University of New York, Stony Brook, N.Y., February 5.
- 1985 *A fish feeding model based on game and catastrophe theories*. CQS/Biomath 597, Seminar Center for Quantitative Science, University of Washington.
- 1984 *A relationship between attitude change and groups size*. 17th annual Mathematical Psychology meeting at the University of Chicago, August.

- 1984 *Temporal patterns of chlorophyll and nitrogen species in a Puget Sound intertidal zone.* American Society of Limnology and Oceanography Meeting, University of British Columbia.
- 1984 *Zooplankton probability distributions: everything coming up gamma* (with A. Okubo), Ocean Science meeting, New Orleans.
- 1984 *Mathematical models for zooplankton swarms: their formation and maintenance* (with A. Okubo), Ocean Science meeting, New Orleans.
- 1984 *A predator-prey behavior model based on catastrophe and game theories.* GUTSHOP'84. 4th workshop on fish food habits at Pacific Grove, California, Dec 2-6.
- 1984 *The limitations and uses of microcomputers.* Psychiatry Grand Rounds, St. Vincent's Hospital, New York. (Invited lecture)
- 1984 *Fish Schooling*, New York City Sea Gypsies. (Invited lecture)
- 1984 *A look at why and how animals form groups.* Littoral Society of New York.
- 1984 *Probability models.* Marine Sciences Research Center, State University of New York at Stony Brook.
- 1984 *Probability distributions in biology.* Estuaries Class 507, winter quarter.
- 1983 *An underway water sampling system* (with A. Copping), American Society of Limnology and Oceanography Meeting, San Francisco.
- 1983 Saanich Inlet Conference, Institute of Ocean Sciences, Sydney, British Columbia.
- 1982 *A stochastic model for the size of fish schools.* Dept. of Biophysics, Kyoto University.
- 1982 NSF/Indonesia Seminar on Marine Science, Jakarta, Indonesia.
- 1978 *Water masses of the eastern tropical North Pacific.* Dept. of Oceanography, Oregon State University.
- 1976 *A model for the chlorophyll maximum.* Joint Oceanography Assembly, Edinburgh.